

Volcanoes and Earthquakes

1892 was simultaneous with that of the great volcano Gunona Avu on Sangir Island, of the Celebes group, which caused the death of no less than 1,500 inhabitants, burnt or suffocated under its torrents of lava and ashes, and the sudden disappearance of all the springs of drinking-water.

Volcanologists say that the coincidence in the date of the two eruptions was purely a matter of chance, for the two centres of volcanic activity are much too far removed to have any connection whatever with one another.

Last year the eruption of Etna was followed within a short time by a tremendous outburst at Mauna Loa, the great volcano of Hawaii, respecting which few details have as yet reached Europe.

Professor Salvator Arcidiacono concludes his account of the present state of Etna by saying

that the late eruptions (there was another of less importance during the night between August 4 and 5) have excited great concern amongst the crowded population which inhabits the numerous centres lying all around the volcano; and this is not to be wondered at, for these explosions show clearly that Etna is not sleeping, but preparing, unknown to us, in its deep underground workshops, the material for some future eruption.

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Modern Military Rifles

BY W. J. GORDON

PREVIOUS to 1851, the only regiments in the British Army that carried a rifle were the two so-called rifle regiments. Their weapon was the Brunswick, invented by Captain Berner, which had been adopted in 1835 and is noteworthy as being the first firearm in our service fitted with a percussion lock, it being seven years afterwards when the flint-lock was abandoned in the smooth-bore familiarly known as Brown Bess. The Brunswick was the last rifle to carry a spherical bullet, but this bullet had a belt round it. The rifling had only two grooves; these made a complete turn in the length of the barrel, and into them the belt of the bullet had to fit.

Conoidal projectiles had been advocated for some two hundred years in vain, until in 1844 the French adopted the "tige" system of Thouvenot. This "tige" was a thick steel pin fixed upright in the bottom of the bore so that the powder should lay round it and the bullet rest on the top, the bullet being conical in front and concave at the back. The "tige" was troublesome to clean, and in many ways unsatisfactory, and the French soldier especially was gratified when Captain Minié discovered that by placing an iron cap in the base of the bullet it could be allowed to rest on the powder without any other support, and would be expanded sufficiently by the gases to take the rifling. The Minié rifle was simply the Thouvenot without the "tige" and with the new bullet.

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The Minié replaced the Brunswick. It was used in the Kaffir War of 1851, and in the Crimea at Alma and Inkerman, but it was never generally supplied, having been condemned in a few years in favour of the Enfield, which had the greased cartridges of which so much was made in the Indian Mutiny. This rifle was 4 ft. 6½ in. long, and 3 ft. 3 in. in length of barrel, its bore was .577 of an inch, the twist of its rifling was 1 in 78, and its bullet weighed 535 grains. The development of the modern firearm has caused a decrease in every one of these particulars. The Lee-Metford is nearly 5 inches shorter, its barrel is 9 inches shorter, its bore is .303 instead of .577, the twist of its rifling is 1 in 10, and its bullet weighs only 215 grains.

A military rifle must have a flat trajectory; that of the Lee-Metford is so low that for 500 yards it does not rise higher than a man. A flat trajectory means a high muzzle velocity; that of the Lee-Metford is 2,000 ft. per second. A high muzzle velocity means an increased power of charge in proportion to the size of the bullet. If you make the rifle thicker at the breech it is heavier and has more recoil; hence you have to reduce your bullet, but you must not make it too light or it will be deviated by the wind. Thus all the new rifles are much alike in their dimensions.

The Mauser is 4 ft. 2 in. long, so is the Mannlicher used by the Austrians, so is the improved Berdan used by the Russians, the

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Lebel used by the French being 4 ft. 3 in. The barrel of the Lee-Metford is 30 inches long, so is that of the Berdan, the Mannlicher being 30½ in., the Mauser 30¾ in., the Lebel 31½ in. The calibres are: Lee-Metford .303, Mauser .301, Berdan .3, Mannlicher and Lebel .315.

They are all sighted up to 2,250 yards, except the Lee-Metford, which is sighted up to 2,900; and the Mauser, Mannlicher, and Berdan have muzzle velocities of 2,084 ft., the Lebel having one of 2,073 ft., and the Lee-Metford one of 2,000 ft. The twist of the rifling in the Lee-Metford is 1 in 10, in the Mauser and Mannlicher it is 1 in 9.842, in the Lebel it is 1 in 9.45, in the Berdan it is 1 in 9. In their magazines the Mauser, Mannlicher, and Berdan carry only 5 cartridges, the Lebel carries 8, the Lee-Metford 10.

It is with regard to the mechanism of the magazine and the breech that such differences of

opinion exist as to the value of the weapon, and opinion in these things must always be to a large extent a matter of prejudice and taste. So far as accuracy is concerned, the differences are slight and hardly worth consideration, but judged by experimental trials the Lee-Metford is the most accurate. The trial of rifles, however, is not quite so conclusive as that of carriage-guns, for the gun is fired under somewhat similar circumstances to what it will find in action; whereas the rifle, which will then be held in the hand, is tried strapped on a fixed rest. The target is certainly designed to leave as little room for opinion as possible; unlike other targets, it consists of a square 24 ft. on the side, divided up into 6-inch squares, the rifle being aimed at the central cross, and at 500 yards nearly every bullet goes into one of the four central squares, even in a steady wind. It is when the gusts come that the pattern spreads.



Curiosities of Words

Fool.—People who know French will naturally connect this word with *fou, fol, folle*, and will not be surprised to hear that it may be traced through various stages to the Latin *folis*, "bellows." This, in later and popular Latin, meant an empty-headed person, so that *fool* by its origin answers exactly to the expressive term *windbag*.

Forfeit is another word that comes to us from Latin through French. The Latin elements are *foris*, out of doors, outside, and *factumo*, done. A *forfeit* is therefore something done outside the province of duty, a misdeed. This original sense is now lost in another, the penalty of the misdeed.

Forlorn hope is by its form connected with *hope*, and even by some writers it has been used in the sense of a "dwindling, unreliable" hope; but it is really a transformation of a Dutch phrase *verloren hoop*, the lost troop, the Dutch *hoop* being an equivalent to our word *heap*. In French a storming party is known as *enfants perdus*, lost children, their lives not being worth an hour's purchase.

Fortepiano was the name for the musical instrument we now call the pianoforte. It arose from the fact that pedal actions were added to the old harpsichord or spinet for the purpose of producing a louder or softer tone.

Fret, Fretwork.—In the first of these words *fret* is originally a verb, meaning to eat, and said of animals, like the German *fressen*. Afterwards it meant to "gnaw, worry, and to destroy by eating away." Hence it is applied to the effect of the passions. In *fretwork* *fret* is a sub-

stantive of French origin, meaning "trellis-work."

Garble.—There was once a substantive *garble* which meant refuse (of spices). Both the substantive and the verb can be traced to an Italian original, being terms connected with the spice trade, formerly carried on through the Red Sea and the Mediterranean. But the Italian is the re-fashioning of an Arabic word, and there is reason to think that this is not a native Arabic word, but formed from a late Latin verb *cribellare*, "to sift." To *garble* then was to sift (spice), and a *garbler* was one charged with that duty. Another sense is now found only in the phrase to *garble* the coinage—*i.e.* to pick out the good coins for the melting-pot and return the rest into circulation. From this we get the current sense of making selections from, usually with a mischievous purpose.

Garnet.—The Latin for pomegranate is *granatum*, which appears in old French as *grenat, gernat*, and in middle Dutch as *garnate*. The red juice of the pomegranate led people to apply the term to a stone of the same colour.

Gas.—This word has been in use for rather more than 100 years to signify an airlike fluid of various kinds; but nearly 200 years before it had been used for an occult principle existing in all bodies. The inventor was a Dutchman, Van Helmont. His account of it is that he formed it from the Greek *χάος* (chaos—the Dutch *g* is sounded like *gh*) because he considered that the element he wished to name was very much like chaos.